BERTIN ENGINEERING

STORMWATER OPERATION
&
MAINTENANCE MANUAL

TOWNHOUSE DEVELOPMENT
BLOCK 4201.01, LOT 33.03
GROVERS MILL ROAD & MALL ACCESS ROAD
TOWNSHIP OF LAWRENCE, MERCER COUNTY, NEW JERSEY
BE# 21-210

DATE PREPARED:	OCTOBER 26, 2023
DATE REVISED:	NOVEMBER 17, 2025

PREPARED FOR:
TRICONE
2525 US-130 SUITE B4
CRANBURY, NJ 08512

PREPARED BY:
BERTIN ENGINEERING
66 GLEN AVENUE
GLEN ROCK, NJ 07452

CALISTO J. BERTIN, P.E.
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STORMWATER OPERATION & MAINTENANCE MANUAL

RESPONSIBLE PARTIES

1. Location:	Block 4201.01, Lot 33.03 Grovers Mill Road & Mall Access Road Township of Lawrence, NJ 08648
2. Owner:	Tricone 2525 US-130 Suite B4 Cranbury, NJ 08512 MH@TRICONECO.COM
3. Property Management Company:	*Tricone* 2525 US-130 Suite B4 Cranbury, NJ 08512 MH@TRICONECO.COM
4. Maintenance Contractor:	*Tricone* 2525 US-130 Suite B4 Cranbury, NJ 08512 MH@TRICONECO.COM
5. Designer:	Bertin Engineering, Inc. 66 Glen Avenue Glen Rock, NJ 07452 201-670-6688

The Owner is responsible for the maintenance of the stormwater management facilities for the site. Inspection and maintenance logs are to be provided to the Township Engineer annually by January 31st for the prior year's activities.

This plan is recorded in

Deed Book # _____ Page # ____ with Morris County Clerk on Date _____

STORMWATER OPERATION & MAINTENANCE MANUAL

Specific Maintenance Procedures

1. Construction Sequencing and Quality Control

Construction sequencing shall balance the timing of land disturbance activities and the installation of measures to control erosion and sediment in order to reduce on-site erosion and off-site sedimentation. Construction sequencing is utilized to plan earthwork and erosion control activities on site in order to preserve water quality within the site's watershed area. Proposed soil erosion and sediment control practices must be utilized throughout construction.

2. Regular Maintenance of Site:

The proposed stormwater systems are intended to treat and convey the stormwater on the property. The maintenance plan is prepared to ensure the system operates at its maximum efficiency. The responsible party is accountable to ensure the operation, maintenance, repair, and safety of the stormwater system. Maintenance of the stormwater system should be performed on a regular basis. This includes but is not limited to debris and sediment removal with proper disposal, mosquitoes/insect control and inspection work.

Other regular maintenance includes mowing of lawn areas, pruning and/or restoration of landscaping and vegetation, restoration of eroded areas, and the elimination of any mosquito breeding habitats as needed. The parking lot shall be swept by a street sweeper on a quarterly basis.

3. Maintenance of Stormwater Management:

A. General

All trees, shrubs, and underbrush must be pruned or trimmed as necessary to maintain access to the stormwater management measures such as inlets, manholes, detention systems, outlet control structures, rip-rap, flared-end section and dry wells. The proposed system must not increase health or safety risks in any way. Increased staffing, improved equipment and more specialized training may be required to properly maintain the new facility. Two people will be needed to perform routine maintenance of the systems. The routine equipment to be utilized for the maintenance tasks include a jet vacuum vehicle, shovels, lighting equipment and a wheel barrel or truck for the hauling of debris. During maintenance and inspections, all associated safety and protection measures must be taken. Water, mosquito control chemicals, and concrete repair materials may also be required depending on the condition

of the structures. Inspection and maintenance logs shall be maintained and provided upon request of township officials.

B. Inlets, Manholes, Flared End Section & Outlet Control Structure

Inlets, manholes, flared end section and outlet control structure shall be inspected at least semi-annually as well as after every storm exceeding 1 inch of rainfall in a one hour period. Concrete inlets, manholes, flared end section and outlet control structure should be checked annually for cracking, subsidence, spalling, erosion and deterioration. Removal of debris, trash, sediment, and other waste materials should be performed when there is a building of sediment in excess of 2 inches. This can be removed manually or by vacuum. Disposal of such debris must be performed at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

The attached “Maintenance Inspection for Inlets, Manholes, Flared End Section & Outlet Control Structure” and “Maintenance Log for Inlets, Manholes, Flared End Section & Outlet Control Structure” must be completed during every routine maintenance and inspection.

C. Cultec Recharger Units

Please see the attached Cultec Operation & Maintenance Information for maintenance instructions for the water treatment units. Disposal of debris, trash, sediment, and other waste material removed from the stormwater drainage system is to be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

The party responsible for the maintenance plan as indicated on page 2 shall coordinate the inspections as per the attached maintenance schedule.

The Annual Record of Operation and Maintenance must be completed during every routine maintenance and inspection for each unit.

D. Sand Filter

Basin #3 is a sand filter. The sand filter shall be inspected for excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall in a one hour period. Disposal of debris, trash, sediment, and other waste material removed from the sand filter and forebay are to be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations. The construction of the sand filter should avoid compaction of the sand layer. The use of heavy earth moving equipment

should be prohibited in the sand filter. All structural components such as the outlet control structure must be inspected for cracking, subsidence, spalling, erosion and deterioration at least annually. The sand bed should be inspected at least twice annually. The infiltration rate of the sand bed material may also be retested. The water must infiltrate 72 hours after the end of the stormwater quality design storm, or the sand filter must be replaced.

The attached "Maintenance Inspection for Sand Filter" and "Maintenance Log for Sand Filter" must be completed during every routine maintenance and inspection.

E. Bio Retention Basins

Basins #1 and #2 are bioretention basins. On a monthly basis, the bioretention basin should be checked for:

a) Trash and debris: Clear out litter, leaves, and other debris, particularly from inlet and outlet structures, to prevent blockages that can cause overflow.
b) Weeding: Remove invasive species and weeds that compete with desired vegetation.
c) Erosion and soil repair: Check for and repair any areas of erosion, and re-plant if necessary.

At least twice a year the following maintenance is to be performed:

a) Plant replacement: Remove dead plants and replace them with new ones in the spring and fall.
b) Sediment removal: Clear accumulated sediment from pretreatment devices (like forebays) and the main basin, especially after winter or in late fall and early spring.
c) Outlet Control Structure. All structural components of the structure must be inspected for cracking, subsidence, spalling, erosion and deterioration. Ensure that all orifices are open and functioning.

F. Rip-Rap Apron & Preformed Scour holes

Rip-rap apron & preformed scour holes shall be inspected at least semi-annually as well as after every storm exceeding 1 inch of rainfall in a one hour period. Removal of debris, trash, sediment, and other waste materials should be performed when there is a building of sediment in excess of 2 inches. This can be removed manually. Disposal of such debris must be performed at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

The attached “Maintenance Inspection for Rip-Rap & Preformed Scour Holes” and “Maintenance Log for Rip-Rap & Preformed Scour Holes” must be completed during every routine maintenance and inspection.

G. Vegetated Areas

Grass should be mowed at least once a month during the growing season. Vegetated areas shall be inspected annually for erosion and scour and for unwanted trees and weeds. When establishing or restoring vegetation, biweekly inspections of vegetation health shall be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity shall be performed twice annually during both the growing and non-growing season. If vegetation has greater than 50 percent damage, the area will be reestablished in accordance with the original specifications and the inspection requirements presented above. All use of fertilizers, mechanical treatments, pesticides, and other means to assure optimum vegetation health must not compromise the intended purpose of the detention basin. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible. All vegetated areas shall be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the remaining vegetation and basin subsoil.

H. Emergency Plan In Case of Failure of SWM Facilities

The aboveground detention basin is designed with a minimum 1 ft of freeboard available above the 100-year peak elevation.

4. Maintenance Records

Records of the maintenance shall be maintained by the management company or building superintendent and made available to health inspectors or other Township officials. Attached are the applicable maintenance logs and forms.

5. Design Summary for Bioretention/Infiltration Basin #1

Hydrology Design Targets

1. The permeability rate of the subsoil is at least 0.5 inches/hour
2. This basin is designed with a subsoil permeability rate of 1.222 inches/hour (pre-construction). Actual subsoil permeability was found to be 10 inches/hour as tested on March 29, 2023.
3. The design drain time is less than 72 hours.

4. On June 10, 2024 a test pit was excavated to elevation 70.0, which is 5.5 feet below the bottom of the bioretention basin (elevation 75.5). There was no evidence of seasonal high water.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.31 inches in 24 hours	5.01 inches In 24 hours	8.33 inches In 24 hours
Runoff Volume (cubic feet)	0	5,353	6,839	25,294
Peak Flow Rate (cfs)	0	0.21	1.77	7.04
Water Surface Elevation (feet)	75.83	76.41	76.68	76.99

2. The emergency spillway is at EL. 77.00 feet.

Basin Configuration Targets

1. Pretreatment is provided by curb inlets with Type “N” curb piece.
2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Outlet Pipe #1	Pipe	15” HDPE, 80 LF @ 2.8%	74.00
Outlet #1	Orifice	4”	76.00
Weir #1	Weir	(2) 3’	76.50
Overflow Grate #1	Riser	4’x4’	77.00
Overflow Spillway	Rect. Weir	8’	77.00

3. Soil Layer
   - The depth of soil bed shall be 18 inches, which requires a volume of 8,580 cubic feet of soil.
   - The bottom elevation of the soil layer is EL. 74.00 feet.
   - The soil layer is designed to be replaced if it fails to drain the Water Quality Design Storm within 72 hours.
   - The soil bed is covered by vegetation.

6. Design Summary for Bioretention/Infiltration Basin #2

Hydrology Design Targets

1. The permeability rate of the subsoil is at least 0.5 inches/hour
2. This basin is designed with a subsoil permeability rate of 1.222 inches/hour (pre-construction). Actual subsoil permeability was found to be 10 inches/hour as tested on March 29, 2023.
3. The design drain time is less than 72 hours.
4. On March 29, 2023, a test pit was excavated to elevation 70.0, which is 3 feet below the bottom of the bioretention basin (elevation 73.0). There was no evidence of seasonal high water.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.31 inches in 24 hours	5.01 inches In 24 hours	8.33 inches In 24 hours
Runoff Volume (cubic feet)	0	6,357	7,523	30,217
Peak Flow Rate (cfs)	0	0.44	0.93	4.68
Water Surface Elevation (feet)	73.23	73.62	73.98	74.50

2. The emergency spillway is at EL. 74.50 feet.

Basin Configuration Targets

1. Pretreatment is provided by curb inlets with Type “N” curb piece.
2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Outlet Pipe #1	Pipe	15” HDPE, 11 LF @ 2.0%	71.50
Outlet #1	Orifice	4”x10”	73.33
Overflow Grate #1	Riser	4’x4’	74.50
Overflow Spillway	Rect. Weir	8’	74.50

3. Soil Layer
    - The depth of soil bed shall be 18 inches, which requires a volume of 10,067 cubic feet of soil.
    - The bottom elevation of the soil layer is EL. 71.50 feet.
    - The soil layer is designed to be replaced if it fails to drain the Water Quality Design Storm within 72 hours.
    - The soil bed is covered by vegetation.

7. Design Summary for Sand Filter/Infiltration Basin #3

Hydrology Design Targets

1. This sand filter is designed with a sand bed permeability rate of 2 inches/hour
2. This sand filter is designed with a subsoil permeability rate of 0.620 inches/hour (pre-construction). Actual subsoil permeability was found to be 23 inches/hour as tested on March 29, 2023.
3. The design drain time is less than 72 hours.
4. On March 29, 2023, a test pit was excavated to elevation 61.0, which is 6.5 feet below the bottom of the infiltration basin (elevation 67.5). Seasonal high water table was found at elevation 64.5.

Hydraulic Design Targets

3. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.31 inches in 24 hours	5.01 inches In 24 hours	8.33 inches In 24 hours
Runoff Volume (cubic feet)	0	28,511	61,089	152,550
Peak Flow Rate (cfs)	0	0.49	4.92	21.73
Water Surface Elevation (feet)	68.05	69.53	69.81	70.99

4. The emergency spillway is at EL. 71.00 feet.

Basin Configuration Targets

1. Pretreatment is provided by curb inlets with Type “N” curb piece.

2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Outlet Pipe #1	Pipe	24” RCP, 37 LF @ 3.0%	66.50
Outlet #1	Orifice	3”	68.25
Outlet #2	Orifice	(3) 5”x32”	69.50
Overflow Grate #1	Riser	4’X4’	71.00
Overflow Spillway	Rect. Weir	35’	71.00

3. Sand Layer
    - The depth of sand layer shall be 6 inches, which requires a volume of 19,822.5 cubic feet of sand.
    - The bottom elevation of the sand layer is EL. 67.0 feet.
    - The sand layer is designed to be replaced if it fails to drain the Water Quality Design Storm within 72 hours.
    - The sand bed is not covered by top soil and vegetation.

MAINTENANCE INSPECTION FOR INLETS, MANHOLES & OUTLET CONTROL STRUCTURES

Residential Development
Grovers Mill Road & Mall Access Rd
Lawrence, NJ

NOTE: INSPECTIONS TO BE EVALUATED DURING A PERIOD OF DRY AND WARM WEATHER CONDITIONS AT THE PROJECT SITE.

Yes	No	Maintenance Evaluation	Action(s) Required if Answer "Yes"
☐	☐	Is there a buildup of sediment (in excess of 2 inches), trash, debris or any other stormwater pollution?	Remove sediment and evaluate on-site upstream systems. Dispose debris in accordance with local, state, and federal requirements.
☐	☐	Is there standing water?	Evaluate downstream systems for clogging or trash sediment buildup.
☐	☐	Are there any structural failure?	Consult engineer to detemine safety and/or stability of the system.
☐	☐	Are there visible signs of cracking, subsidence, erosion or deterioration of any of the inlets, manholes, outlet control structures or piping?	Consult engineer to detemine safety and/or stability of the system.
☐	☐	Are there any root intrusions or any other vegetation within the inlets, manholes, outlet control systems or piping?	Remove roots and dispose vegetation in accordance with local, state and federal regulations.
☐	☐	Are ladder rungs in manholes or outlet structures damaged, missing, or misaligned?	Repair or replace.
☐	☐	Are any covers or grates missing, damaged, or only partially in place at any inlets, manholes or outlet control structures?	Repair or replace.

MAINTENANCE LOG FOR INLETS, MANHOLES & OUTLET CONTROL STRUCTURES

Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

INSTRUCTIONS: THIS LOG SHALL BE UPDATED TO INCLUDE ALL MAINTENANCE PERFORMED AT A SPECIFIC STORMWATER MEASURE.

DATE	PERSON CONDUCTING MAINTENANCE	AREA OF MAINTENANCE	PROBLEM(S) FOUND	ACTION(S) TAKEN

MAINTENANCE INSPECTION FOR CULTEC CHAMBERS

Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

NOTE: INSPECTIONS TO BE EVALUATED DURING A PERIOD OF DRY AND WARM WEATHER CONDITIONS AT THE PROJECT SITE.

Yes	No	Maintenance Evaluation	Action(s) Required if Answer "Yes"
☐	☐	Is there a buildup of sediment (in excess of 2 inches), trash, debris or any other stormwater pollution within the chamber?	Remove sediment, trash, debris, etc. Dispose debris in accordance with local, state, and federal requirements.
☐	☐	Is there any structural failure?	Consult engineer to determine safety and/or stability of the system.
☐	☐	Are there visible signs of cracking, subsidence, erosion or deterioration of any of the chamber?	Consult engineer to detemine safety and/or stability of the system.
☐	☐	Are there any signs of unusual color, odor, or turbidity within the chamber?	Evaluate header pipes and structures for possible sediment, trash and debris. Cleanse system if any of the aforementioned obstructions are encountered. Dispose obstructions in accordance with local, state and federal requirements.
☐	☐	Are there root intrusions or any other plant growth occuring with the system(s)?	Remove vegetation and dispose in accordance with local, state and federal regulations.
☐	☐	Are mosquito or other insect habitats consistenly present in the area as a result of the structure(s)?	Use appropriate mosquito insecticides or agents to control or eliminate insect breeding.

MAINTENANCE LOG FOR CULTEC CHAMBERS

Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

INSTRUCTIONS: THIS LOG SHALL BE UPDATED TO INCLUDE ALL MAINTENANCE PERFORMED AT A SPECIFIC STORMWATER MEASURE.

DATE	PERSON CONDUCTING MAINTENANCE	AREA OF MAINTENANCE	PROBLEM(S) FOUND	ACTION(S) TAKEN

MAINTENANCE INSPECTION FOR SAND FILTER

Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

NOTE: INSPECTIONS TO BE EVALUATED DURING A PERIOD OF DRY AND WARM WEATHER CONDITIONS AT THE PROJECT SITE.

Yes	No	Maintenance Evaluation	Action(s) Required if Answer "Yes"
☐	☐	Is there a buildup of sediment (in excess of 2 inches), trash, debris or any other stormwater pollution within the forebay/sand filter of the basin?	Remove sediment, trash, debris, etc. Dispose debris in accordance with local, state, and federal requirements.
☐	☐	Is there any structural failure?	Consult engineer to determine safety and/or stability of the system.
☐	☐	Are there visible signs of cracking, subsidence, erosion or deterioration of any of the forebay/sandfilter of the basin?	Consult engineer to detemine safety and/or stability of the system.
☐	☐	Are there any signs of unusual color, odor, or turbidity within the discharged water?	Evaluate underdrain pipes and structures for possible sediment, trash and debris. Cleanse system if any of the aforementioned obstructions are encountered. Dispose obstructions in accordance with local, state and federal requirements.
☐	☐	Are there root intrusions or any other plant growth occuring with the system(s)?	Remove vegetation and dispose in accordance with local, state and federal regulations.
☐	☐	Are mosquito or other insect habitats consistenly present in the area as a result of the structure(s)?	Use appropriate mosquito insecticides or agents to control or eliminate insect breeding.

MAINTENANCE LOG FOR SAND FILTER

Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

INSTRUCTIONS: THIS LOG SHALL BE UPDATED TO INCLUDE ALL MAINTENANCE PERFORMED AT A SPECIFIC STORMWATER MEASURE.

DATE	PERSON CONDUCTING MAINTENANCE	AREA OF MAINTENANCE	PROBLEM(S) FOUND	ACTION(S) TAKEN

MAINTENANCE INSPECTION FOR BIORETENTION BASIN

Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

NOTE: INSPECTIONS TO BE EVALUATED DURING A PERIOD OF DRY AND WARM WEATHER CONDITIONS AT THE PROJECT SITE.

Yes	No	Maintenance Evaluation	Action(s) Required if Answer "Yes"
☐	☐	Is there a buildup of sediment (in excess of 2 inches), trash, debris or any other stormwater pollution within the forebay/sand filter of the basin?	Remove sediment, trash, debris, etc. Dispose debris in accordance with local, state, and federal requirements.
☐	☐	Is there any structural failure?	Consult engineer to determine safety and/or stability of the system.
☐	☐	Are there visible signs of cracking, subsidence, erosion or deterioration of any of the forebay/sandfilter of the basin?	Consult engineer to detemine safety and/or stability of the system.
☐	☐	Are there any signs of unusual color, odor, or turbidity within the discharged water?	Evaluate underdrain pipes and structures for possible sediment, trash and debris. Cleanse system if any of the aforementioned obstructions are encountered. Dispose obstructions in accordance with local, state and federal requirements.
☐	☐	Are there root intrusions or any other plant growth occuring with the system(s)?	Remove vegetation and dispose in accordance with local, state and federal regulations.
☐	☐	Are mosquito or other insect habitats consistenly present in the area as a result of the structure(s)?	Use appropriate mosquito insecticides or agents to control or eliminate insect breeding.

MAINTENANCE LOG FOR BIORETENTION BASIN

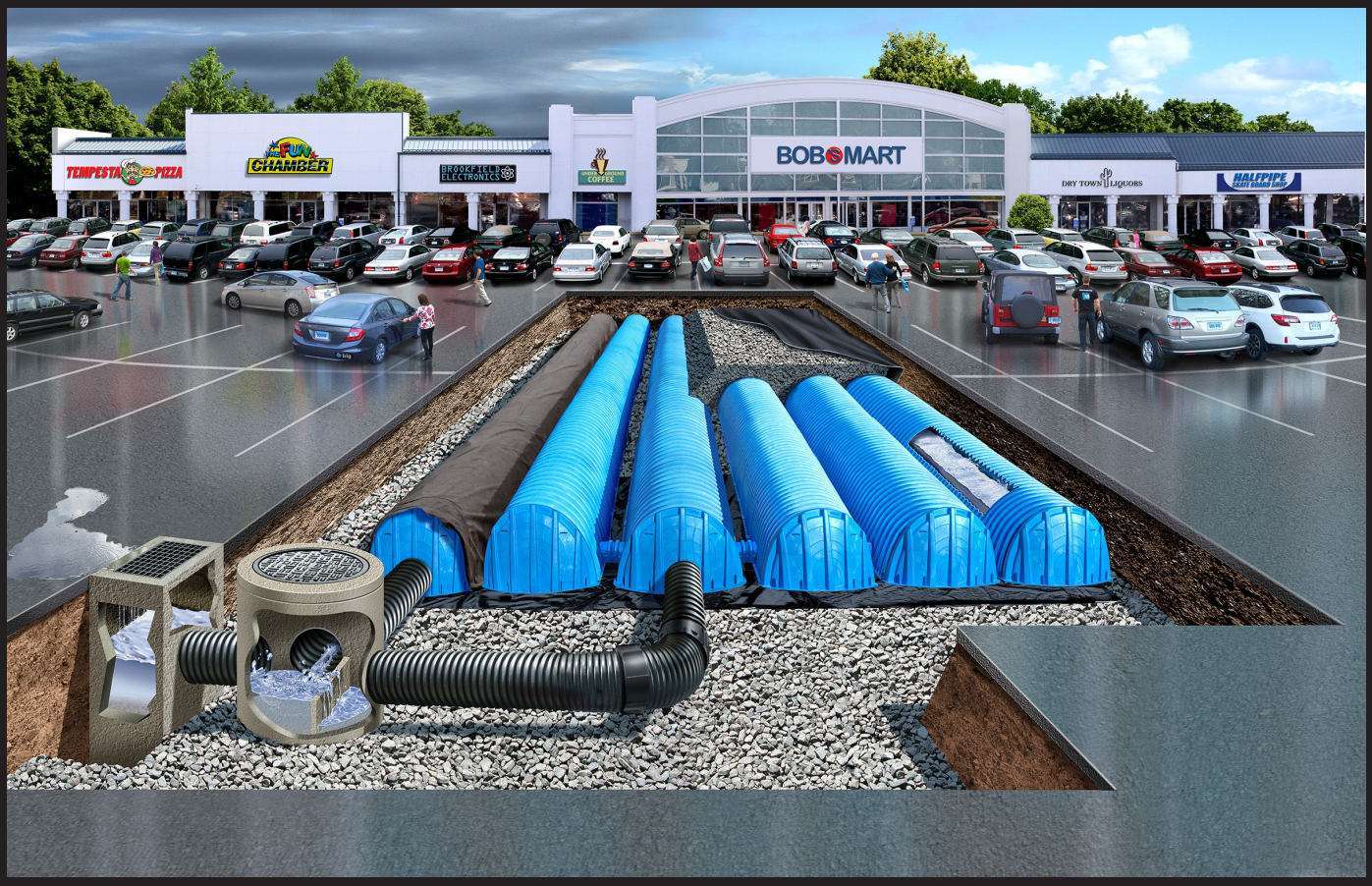
Residential Development
Grovers Mill Road & Mall Access Road
Lawrence, NJ

INSTRUCTIONS: THIS LOG SHALL BE UPDATED TO INCLUDE ALL MAINTENANCE PERFORMED AT A SPECIFIC STORMWATER MEASURE.

DATE	PERSON CONDUCTING MAINTENANCE	AREA OF MAINTENANCE	PROBLEM(S) FOUND	ACTION(S) TAKEN

CONTACTOR® & RECHARGER®

STORMWATER MANAGEMENT SOLUTIONS



OPERATION & MAINTENANCE GUIDELINES

FOR CULTEC STORMWATER MANAGEMENT SYSTEMS

CULTEC®

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U.S. Patents 6,129,482; 6,322,288; 6,854,925; 7,226,241; 7,806,627; 8,366,346; 8,425,148; U.S. Designs D613,819; D638,095; D668,318; Canadian Patent 2,450,565; 2,591,255; Canadian Designs 129144; 135983; 159073; 160977; and/or other U.S. or Foreign Patent(s) or Patent(s) Pending.

Contact Information:
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For technical support, please call (203)775-4416 ext. 203 or e-mail tech@cultec.com.

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January 2020

These instructions are for single-layer traffic applications only. For multi-layer applications, contact CULTEC.
All illustrations and photos shown herein are examples of typical situations. Be sure to follow the engineer's drawings.
Actual designs may vary.

This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Operation and Maintenance Requirements

I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

II. Inspection and Maintenance Options

A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pretreatment device). CCTV inspection of this row can be deployed through this access port to deter mine if any sediment has accumulated in the inlet row.

B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.

1. Manhole Access
This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

2. StormFilter Access
Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.

B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.

C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.

D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

IV. Suggested Maintenance Schedules

A. Minor Maintenance
The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris, as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris, as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris, as required.

B. Major Maintenance
The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)

	Frequency	Action
Inlets and Outlets	Every 3 years	• Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	• Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	• Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	• Clean stormwater management chambers and feed connectors of any debris. • Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. • Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	• Clean stormwater management chambers and feed connectors of any debris. • Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. • Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. • Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. • Attain the appropriate approvals as required. • Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1st year	• Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	• Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	• Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.

WQMP
Operation & Maintenance (O&M) Plan

Project Name:_____

Prepared for:

Project Name: _____

Address:_____

City, State Zip:_____

Prepared on:

Date:_____

This O&M Plan describes the designated responsible party for implementation of this WQMP, including: operation and maintenance of all the structural BMP(s), conducting the training/educational program and duties, and any other necessary activities. The O&M Plan includes detailed inspection and maintenance requirements for all structural BMPs, including copies of any maintenance contract agreements, manufacturer's maintenance requirements, permits, etc.

8.1.1 Project Information

Project name	
Address	
City, State Zip	
Site size	
List of structural BMPs, number of each	
Other notes	

8.1.2 Responsible Party

The responsible party for implementation of this WQMP is:

Name of Person or HOA Property Manager	
Address	
City, State Zip	
Phone number	
24-Hour Emergency Contact number	
Email	

8.1.3 Record Keeping

Parties responsible for the O&M plan shall retain records for at least 5 years.

All training and educational activities and BMP operation and maintenance shall be documented to verify compliance with this O&M Plan. A sample Training Log and Inspection and Maintenance Log are included in this document.

8.1.4 Electronic Data Submittal

This document along with the Site Plan and Attachments shall be provided in PDF format. AutoCAD files and/or GIS coordinates of BMPs shall also be submitted to the City.

Appendix ____

BMP SITE PLAN

Site plan is preferred on minimum 11” by 17” colored sheets, as long as legible.

BMP OPERATION & MAINTENANCE LOG

Project Name: _____

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance, and Inspection Activity Performed

Minor Maintenance

Frequency		Action
Monthly in first year		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Month 1	Date:	
□ Month 2	Date:	
□ Month 3	Date:	
□ Month 4	Date	
□ Month 5	Date:	
□ Month 6	Date:	
□ Month 7	Date:	
□ Month 8	Date:	
□ Month 9	Date:	
□ Month 10	Date:	
□ Month 11	Date:	
□ Month 12	Date:	
Spring and Fall		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
□ Spring	Date:	
□ Fall	Date:	
One year after commissioning and every third year following		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
□ Year 1	Date:	
□ Year 4	Date:	
□ Year 7	Date:	
□ Year 10	Date:	
□ Year 13	Date:	
□ Year 16	Date:	
□ Year 19	Date:	
□ Year 22	Date:	

Major Maintenance

	Frequency		Action
Inlets and Outlets	**Every 3 years**		Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
			Notes
	□ Year 1	Date:	
	□ Year 4	Date:	
	□ Year 7	Date:	
	□ Year 10	Date:	
	□ Year 13	Date:	
	□ Year 16	Date:	
	□ Year 19	Date:	
	□ Year 22	Date:	
	Spring and Fall		Check inlet and outlets for clogging and remove any debris, as required.
			Notes
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
CULTEC Stormwater Chambers	**2 years after commissioning**		□ Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. □ Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
			Notes
	□ Year 2	Date:	

Major Maintenance

	Frequency		Action
CULTEC Stormwater Chambers	**9 years after commissioning every 9 years following**		□ Clean stormwater management chambers and feed connectors of any debris. □ Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. □ Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
			Notes
	□ Year 9	Date:	
	□ Year 18	Date:	
	□ Year 27	Date:	
	□ Year 36	Date:	
	45 years after commissioning		□ Clean stormwater management chambers and feed connectors of any debris. □ Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. □ Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. □ Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. □ Attain the appropriate approvals as required. □ Establish a new operation and maintenance schedule.
			Notes
	□ Year 45	Date:	

Major Maintenance

	Frequency		Action
Surrounding Site	**Monthly in 1st year**		□ Check for depressions in areas over and surrounding the stormwater management system.
			Notes
	□ Month 1	Date:	
	□ Month 2	Date:	
	□ Month 3	Date:	
	□ Month 4	Date:	
	□ Month 5	Date:	
	□ Month 6	Date:	
	□ Month 7	Date:	
	□ Month 8	Date:	
	□ Month 9	Date:	
	□ Month 10	Date:	
	□ Month 11	Date:	
	□ Month 12	Date:	
	Spring and Fall		□ Check for depressions in areas over and surrounding the stormwater management system.
			Notes
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	□ Spring	Date:	
	□ Fall	Date:	
	Yearly		□ Confirm that no unauthorized modifications have been performed to the site.
			Notes
	□ Year 1	Date:	
	□ Year 2	Date:	
	□ Year 3	Date:	
	□ Year 4	Date:	
	□ Year 5	Date:	
	□ Year 6	Date:	
	□ Year 7	Date:	

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